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ABSTRACT

This overview of videotex covers three types of systems--teletext, viewdata, and cabletext. Teletext, which stores information as a series of pages which are broadcast along with television pictures for viewing on specially adapted television screens, is characterized as journalistic, and the offerings of three British systems--CEEFAX (BBC), ORACLE (ITV), and 4-TEL (C4)--are described. The offerings of viewdata, best known in the United Kingdom as PRESTEL, are also described, with emphasis on the interactive nature of the technology. Applications of viewdata, which uses telephone lines and modems to deliver information, are also briefly described, including electronic mail and bulletin boards, a gateway system for linking user terminals, and teletransactions such as banking and shopping. The costs of both teletext and viewdata are discussed. A brief description of cabletext, a hybrid technology which is not yet fully developed, focuses on its potential impact on other videotext systems. Discussions of the educational role of videotex cover three types of applications: as suppliers of information, as components in teaching about information technology, and as microviewdata and teletext emulation software for DIY ("do-it-yourself") videotex running on a stand-alone microcomputer. A glossary and a 19-item reading list are provided. (DJR)

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CET INFORMATION SHEET No.10

VIDEOTEX

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Introduction

Videotex is one of the new information technologies having been first developed (in the UK) in the late 1970's. All videotex systems are characterised by:

- the use of central computers to store information which can then be distributed widely to screen based receivers (which may be based on television sets or microcomputer VDUs)

- the use of a standard format for displaying information on screen. This gives a 40 column by 26 line 'page' with seven colours available. The typical videotex page is a mix of text and simple graphics.

- ease of use, requiring no special training or computer expertise.

- information that may be updated or amended at any time.

The word 'videotex' is a general term covering three particular types of system - teletext, viewdata and the emerging but as yet undefined cabletext. They each look the same on screen but use different methods to organise and distribute information from their central computers. The major systems in the UK are teletext and viewdata, being most commonly known as CEEFAX and ORACLE (teletext), or PRESTEL (viewdata).

Videotex systems are all computer based with most UK systems running on minicomputers. However, with the development of sophisticated microcomputers in recent years software is now available that allows very small scale videotex systems to be run. Microviewdata and teletext emulation software are increasingly common in education, and with the existence of both public and private systems, the UK is probably the world's biggest user of videotex technology.

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The Systems

TELETEXT

Teletext is probably the most familiar of all the videotex systems. As CEEFAX (BBC), ORACLE (ITV) or 4-TEL (C4) it is often seen in the windows of TV rental shops, or instead of the test card when no programmes are being broadcast. Teletext is a broadcaster's medium and in the UK services are restricted to those provided by the BBC or ITV.

Teletext systems store information on a computer as a series of pages in standard videotex format. These pages are then inserted in rotating sequence into the television signal and broadcast along with the television pictures. Reception is via a standard TV aerial and teletext can be received wherever a good TV signal can be picked up. Most large television sets manufactured nowadays offer teletext as a standard feature and adapters are available for those that do not. Adapters are also now available for some microcomputers. Because it is a broadcast medium teletext is a one-way communication with no direct means of 'interacting' with the information. This is one of the differences between teletext and viewdata.

Teletext information is characteristically journalistic and presented in a 'magazine' format. All the information is gathered by television company specialised staff who make up the pages and store them on their computer. Teletext information typically covers news, arts and entertainment, TV guides and reviews, weather and travel information, business and financial market details. Cartoons and competitions are recent additions. ORACLE and 4-TEL also carry advertising.

Present broadcast licensing arrangements limit the size of teletext services. CEEFAX transmits 100 pages on both BBC 1 and BBC 2, ORACLE transmits about 300 pages and 4-TEL about 50 pages. Their audience is estimated to be some 2 million teletext receivers.

With relatively few pages and specialist staff, teletext information is kept very up to date - indeed, teletext news staff pride themselves on being the first to broadcast any major news story as it breaks. Items such as major sporting events or Budget Day are covered literally minute by minute.

Teletext pages are broadcast in a continuous cycle - page 1, page 2, page 3 etc. Viewers choose a teletext service just as they would a TV Channel and are presented with an index page. All pages are individually numbered so viewers simply use their remote control (or keyboard in the case of a microcomputer) to request a particular page number. Once this page appears in the rotating cycle it is displayed on the screen. Waiting time averages a few seconds.

Because of their relatively small size and journalistic character, UK teletext services are not specialist in nature, serving a general public. However, three specialised applications have been developed recently:

- for deaf viewers. Teletext pages can be displayed 'mixed' with TV pictures and many television programmes are now subtitled for deaf viewers.

- broadcast telesoftware. Teletext pages can store computer programs - to be recorded off-air directly into a microcomputer. CEEFAX broadcasts a telesoftware service on page 700 specialising in BBC micros, 4-TEL is investigating a service for Sinclair Spectrum users.

- support information associated with a particular television programme or subject. Recent broadcasts such as C4's '4-Computer Buffs' have used teletext to provide follow up information or general details which are of course available for much longer than the time that the programme is actually shown. Similarly, details of the C4 licencing scheme for educational recording of programmes are carried on teletext pages.

Each teletext service is only available during its particular channel's broadcasting hours (including test card). Teletext is not a 24 hour service but all services are available free to viewers (all BBC programmes, including CEEFAX, requiring a television licence). There are no other charges for teletext to date.

VIEWDATA

Viewdata is best known in the UK as PRESTEL - British Telecom's public viewdata service. Viewdata, however, is not as restricted a medium as teletext and is used extensively for information networks in private companies, in certain industries like the travel trade, and increasingly by government and other public services such as British Rail.

Viewdata systems store pages of information on computers and use cable links to communicate with users. Usually this link is via a telephone line, either the public network or on privately leased lines. Receivers or terminals use a modem to connect to the cable link and may be adapted television sets or microcomputers.

Reception of or access to a viewdata system depends on the extent of its cable link. PRESTEL may be accessed from any telephone which is connected to the public network. Some privately run systems allow for access via the public telephone network but others are only accessible via a special cable link.

Because viewdata systems use telephone type cables, communication can be two-way (interactive) unlike teletext. Viewdata offers communication from users to the central computer and from user to user via the computer, as well as the central computer to user information link.

Viewdata systems can store a lot of information. Each system has its own intended use and therefore its own sources of information and staffing arrangements. A small private system such as that used by Debenhams for financial management may be maintained by one or two people drawing information from a few sources and using a few pages.

Typically though, viewdata systems offer information from many sources, be they the various departments of a local authority or, in the case of PRESTEL, the 150 registered Information Providers (IPs). These IPs draw on over 1000 separate sources of information which they put onto the system in space leased to them by Prestel who also maintain the central computers. The result on PRESTEL is over 300,000 pages of information. It is impossible to estimate the total number of viewdata users in the UK. PRESTEL has over 50,000 registered users, ICL, the largest of the private networks claims a further 100,000 and expects to carry 2,000,000,000 characters on its network on a Monday morning.

Viewdata information is stored on a central computer and displayed on a terminal on request. Usually, information is stored in a 'tree and branch' structure with successive indices leading to particular kinds of information. Every page is also

individually numbered and once connected to a viewdata system, users may request a page by its number as well as search the indices for what they want. (Requests are made via a keypad - numbers only, or keyboard depending on the kind of terminal in use). There is no appreciable waiting time for any page to appear, though each page takes a couple of seconds to be completed.

Connection to a viewdata system usually involves passwords and these passwords are provided to users by system operators. Passwords are for security purposes and users may find certain information restricted from them. These restrictions are operated by the information provider who may require extra security for some information, or an increased payment, or wishes only to serve a specific audience - such as doctors.

Because of its widespread use there is no particularly characteristic kind of viewdata information, it depends on a service's intended audience. In a sense each viewdata system is a specialist service, more obviously with private systems. Even PRESTEL, though, which is a public service, has lately developed sections aimed at specific audiences. Thus the appearance of Prestel Microcomputing, Prestel Education, Citiservice, Farmlink etc. Actual uses of viewdata vary considerably, many based on the interactive nature of viewdata. This has led to the development of specialised uses covering such topics as:

funds transfer	market surveys
public access information	sales surveys
policy quotations	sales force communication
stock management	railway timetable information
library services	tourist advice
local distribution	agricultural feed formulation
statistics	out of hours trading
product research	education
staff training	used vehicle pricing
government services	car hire details

These and other applications are all based on certain viewdata system features:

(a) **Electronic mail**

- RESPONSE FRAMES. These are set up by the system's information providers and act essentially as pre-addressed mail. You fill in simple details and 'send' the frame which automatically goes back to its source. Response frames are typically used as order forms, as competition entries or to request further details.

- MAILBOX FACILITIES. These offer direct user to user mail. On PRESTEL for instance, each registered user is given a mailbox number and anyone else can send mail from their terminal to that number (called an 'address'). Mailbox frames are essentially blank allowing you to type in a message. Mail is distributed automatically and messages wait on the system until the recipient next connects when they are told of any waiting mail.

- BULLETIN BOARDS. These allow you to send a message which is displayed to anyone else who has access to the board. Typically, bulletin boards are used by specialist groups - such as microcomputing enthusiasts, to 'talk' to each other, discussing problems or giving advice. 'Replies' depend on who happens to be watching at that time.

(b) **Gateway**

Viewdata can be used to link a user's terminal with another computer via the viewdata system's central storage computer. These links need to be built in to the 'third-party' computer but once established offer access to any registered system user. Prestel Education, for example, offers all Prestel users access to the Open University's computer at Milton Keynes and specifically to a database of higher education courses held there. Using viewdata as a 'window' to other systems is a rapidly growing area, particularly for PRESTEL who now offer 18 Gateway Services. Its importance is in the joining of the widespread accessibility of viewdata with the sophisticated computing power of other systems. It is the basis of the whole tele/transaction field.

(c) **Tele/transactions**

The commonest examples being developed presently are:

- BOOKING. The most widespread use of viewdata for transactions is in the travel trade. Flight bookings, confirmations, hotel reservations, holiday information enquiries can all be made using viewdata terminals in travel agents. The National Bus Company, for instance, organises seat bookings on its Rapide inter-city coaches using a private viewdata system linking booking agents, bus stations and NBC Regional Offices.

- BANKING. Gateway links to bank computers offer customers financial facilities at any time. The Bank of Scotland and the Nottingham Building Society are involved in HOMELINK on PRESTEL. Account details, money transfers, calculations on mortgages and in some cases payments can all be arranged using a PRESTEL terminal and are not dependent on opening hours or place.

- SHOPPING. Advertising goods or services on viewdata is increasing, particularly on the public service PRESTEL. For example, using electronic mail CLUB 403 members can order goods from an on-screen catalogue. Suppliers collect the orders from their own terminal and arrange delivery. In many cases payment is made against a credit card number, in some cases it can be arranged automatically via tele/banking.

- SOFTWARE. Computer programs can be stored on viewdata pages and automatically recorded (called downloading) into a receiving microcomputer. Standard protocols exist and it offers the possibility of access to 'libraries' of computer software. MICRONET 800 has been running a Prestel telesoftware service for some time and Prestel Education is to start a service in mid-85.

COSTS

Any viewdata service is available as long as the central computer is running. Most run 24 hour services as they run on computers kept busy by other functions - particularly private in-house systems. PRESTEL, the public service is open 24 hours as well.

The costs of viewdata are complicated but most readers will probably be interested in user costs rather than information providing costs. Essentially, viewdata user costs divide into four items:

(a) Telephone charges

Where access is made via the public network, telephone charges are made by BT at standard rates. PRESTEL is at local call charges in 96% of the UK, the few other systems available to the public are trunk calls unless you are calling from a local number.

(b) Subscription/Registration charges

Most viewdata systems are privately run and do not accept public subscriptions. Local authority run information services tend to be free to use while PRESTEL and Prestel based services charge.

The current PRESTEL subscription is £18.99 per quarter for businesses, £6.00 per quarter for domestic users and a special tariff is available for educational institutions. Other Prestel services such as MICRONET or CITISERVICE may charge extra subscriptions.

(c) Computer connect time charges

Most viewdata systems run by local authorities tend to be free of time charges. PRESTEL charges per minute during office hours and this applies to any access you make be it to PRESTEL or a Prestel based service. Private systems make their own arrangements.

(d) Frame/Information Charges

Frame (page) charges are really only of interest for PRESTEL or Prestel based service users: Most frames are free but some carry charges up to a maximum of 99p (Warnings are given). Response frames may carry a 'postage' charge, but PRESTEL Mailboxes are free. Telesoftware may be 'priced' using frame charges, and some financial information is charged for as well. A frame's price appears in the top right hand corner and the charge is automatically put onto your bill.

CABLETEXT

Cabletext is a hybrid technology which is asociated with the development of Cable TV systems. Its future is dependent entirely on the same factors - social and regulatory, which are influencing the wider development of Cable in the UK at present, and which will determine the overall future for Cable systems.

It is generally agreed that cabletext should continue with the standard videotex screen display but how it will be organised and what services it will offer are still unclear. At a basic level cabletext could simply offer another distribution method for existing services, with television, teletext and viewdata brought side by side to customers sets. Viewers would not notice any difference between these services and existing ones but depending on the particular cable configuration used, prices and tariffs could be different resulting probably in dearer teletext and cheaper viewdata.

If Cable systems are successful however, it seems likely that they will bring changes in the videotex field largely in terms of scale. More viewdata services could be offered for public subscription - certain cable configurations, could bring reduced costs to both users and providers, mainly from improvements in the methods for transmission/reception and the existence of a larger audience to spread unit costs.

More and bigger teletext services could also be offered using Cable Systems. It is relatively inexpensive to set up a teletext channel of 100 frames and if more organisations become involved in the production of material for cable it is likely that some of these will also be offering teletext services. Thorn-EMI have been experimenting with a local teletext service on their Swindon Cable System since 1982 and a teletext magazine Skytext, prepared by British Telecom, has appeared on the European/UK Sky Channel.

Teletext services of up to 10.000 frames are also possible by using half a full cable channel for transmission with a maximum waiting time under 8 seconds for any page. A new design of receiver would have to be widespread for such 'full field' services to be economic but the first televisions with the necessary CCL chips installed are expected on the market during 1985.

Videotex in education

Videotex is not yet widely used in education, but it is a developing field and uses are appearing. They can be divided roughly into three areas:

- videotex services as suppliers of information
- videotex services as components in teaching about information technology
- microviewdata and teletext emulation software for D.I.Y. services.

Videotex services as suppliers of information

A difficulty in certain curriculum subjects is keeping up to date with changing information, or simply 'finding out' certain kinds of things. The PRESTEL viewdata service and both teletext channels carry general information that is useful. Financial and commodity information have proved their worth in economics and business studies teaching. Similarly, home economists have incorporated daily food price details into their work. The news and current affairs sections of public viewdata and teletext services have provided general studies material - particularly for comparative studies of media presentation. Geographers have found weather statistics, especially the Meteorological Office's PRESTEL database, very useful and historians have used the detailed census statistics available on viewdata.

The most extensive educational use of public videotex services though, seems to stem from institutions where librarians have incorporated these information sources into their whole provision, accessible to all. Here, uses vary from teachers preparing lessons to students working on assignments to people checking travel/weather details to see if they can get home!

Uses generally are based on whatever information happens to be available that can be fitted into a teaching or learning programme. Information specifically aimed at a wider education audience presently exists only on PRESTEL, provided by three organised IPs, though occasional items appear on both teletext channels.

CET runs an Educational Umbrella Service on PRESTEL with some 3,000 pages of information from over 150 sources (page 211).

The Department of Education and Science runs over 200 frames on PRESTEL giving detailed information on the education system in England and Wales, specialist facilities, rights and responsibilities, grants and financial assistance, statistics and legal matters affecting education (page 50043).

Since January 1985 Prestel Education has been running a service aimed at schools (page 888). A-Z guides to all the education information on PRESTEL are accompanied by specialised sections on HE courses, educational computing, careers and IT in the curriculum. Over 10,000 pages of education information are available through Prestel Education.

Developments are also underway in private viewdata systems for educational use. Several education authorities are exploring the possibility of using viewdata to link their central staff with their travelling representatives and institutions. Items such as arranging supply teacher cover, publicising INSET courses, providing financial details to head teachers, or linking advisers by electronic mail are all under scrutiny. Kent Education Authority, for example, already handles supplies orders on a private viewdata system linking its central supply depot to schools.

Other local authority viewdata initiatives, such as Kingston-upon-Thames' KINGTEL local service carry basic details from the education department alongside other departmental information.

Videotex services as components in teaching about information technology

'Information technology' is taking over from 'computer studies' as a subject for study nowadays and videotex services are mentioned as topics in most syllabuses. Being both national and public, CEEFAX, ORACLE, 4-TEL and PRESTEL are all readily available to educational institutions. Increasingly, teletext and viewdata are being used to provide first hand experience of computerised information systems to students.

Having such services actually available increases the depth with which they may be studied. As well as understanding them as systems, students can also come to appreciate their organisation and sources, their coverage and content, and their similarities or differences in use.

Arguably, though, the most important videotex development for education is the advent of 'do-it-yourself' systems.

Microviewdata and teletext emulation software

Essentially these provide Do-It-Yourself videotex running on a stand-alone microcomputer and this is the fastest growing use of videotex in education. DIY videotex does not rely on computer expertise and anyone familiar with a word processor is halfway to page editing already.

Microviewdata software enables you to set up and run miniature PRESTEL look-alikes with exactly the same page format and database organisation. The difference being that you design and input the information yourself and no connection or telephone charges are incurred. Pages are stored on disc and displayed on request. Pages may also be printed out.

Teletext emulation software enables you to set up and run miniature CEEFAX and ORACLE look-alikes with exactly the same page format and 'rotating sequence' organisation. Again, you design and input information but no TV aerial connection is required as pages are stored on disc and displayed on request. Pages may also be printed out.

It is important to say that among the 20 or so programs presently available each has slightly different features and no two page editing procedures are exactly the same. Indeed, some bridge both teletext and viewdata features together. However, basically they are all designed to do the same job, which is to provide a working videotex service on a stand-alone microcomputer, and all derive from the standard videotex format. So the main differences between them stem from their sophistication.

The simplest program provides up to 15 pages and basic editing routines, the most sophisticated provides a virtual professional system including animation.

Some of these programs also include routines that allow you to connect to and access public services such as PRESTEL and this adds an important extra option for DIY database designers. Pages from the public services may be recorded (downloaded) onto disc and then incorporated into DIY databases along with your own material. (Copyright provisions exist on some information services though, it is always best to check with a provider first though most are sympathetic to education users).

The educational importance of DIY videotex is two fold. Firstly it places the whole process in your hands. From collection to display, the range of organisational, creative and manipulative skills necessary to set up and run a database become part of teaching and learning about information technology. The resulting display looks exactly like any other videotex service but its content, design and audience are determined by you as the source of the service. Secondly, it does not incur any cost after initial purchase.

If you then choose to access a public service such as PRESTEL, the downloading of pages into your own database for later display helps to reduce the costs of using the public service regularly.

Applications of DIY videotex vary. It is still too undeveloped to have typical uses. Some recent examples are:

- a middle school teacher with all their work cards on microviewdata. Easily edited, these cards use colour to highlight certain words requiring action - eg. look red ones up in the dictionary, and are printed out by pupils on demand.

- a secondary school electronic magazine produced by 4th year IT course pupils as a counterpart to their printed version.

- a secondary school networking a viewdata service around public spaces in school, including the lunch queue. This gives a noticeboard that is changed every day centrally.

- assignments by pupils regarded as remedial in English involving the creation of microviewdata databases on their interests. Learning to write and edit copy on-screen improved their language expression, collecting and sifting

information improved their organisation. The resulting display did not suffer because of any handwriting difficulties, and using their own interests improved their motivation.

- microviewdata materials written by FE tutors for students in General Studies. The 'tree and branch' method of organisation can offer a number of optional answers to any question. Each answer can then lead to particular pages, giving details of why it was the wrong one, suggesting alternatives or further work, or progressing the study. No computer expertise is needed to write or use microviewdata.

- a library where microviewdata is used to store details on the sources used by pupils for information on topic work. Later pupils can refer to earlier pupils' experience and add sources as they come across them. So, doing Vikings? check out the Vikings database disc!

These examples are chosen only as an illustration of the range of uses that DIY videotex is being put to in educational settings. It's not an exhaustive list and time will no doubt result in even more imaginative uses of DIY and public service videotex. CET would be interested to hear from anyone in education using videotex, about their experiences.

Simple Glossary

CEEFAX - The BBC's teletext service

Electronic mail - The transmission of information by electronic means from person to person.

Frame(s) - A screenful of information, standardized in videotex systems as 24 rows of 40 character positions. Nowadays interchangeable with PAGE.

Gateway - A facility within a viewdata system to allow a user access to another computer outside the system but connected to it.

Information provider (IP) - One who supplies and maintains a section of information on the database.

Interactive - A term to describe two-way communication between users and computer systems.

Keypad - A small simplified keyboard, numbers only, used for teletext and viewdata.

Microviewdata (formerly called local viewdata) - Software that allows users to create videotex systems and databases themselves using a microcomputer.

Modem - a device to connect a viewdata terminal to the cable (or telephone) link to the central computer.

ORACLE - The ITV's teletext service.

PRESTEL - The proprietary name for British Telecom's public viewdata service.

Page - See Frame.

Response frame - A frame which allows a user of a viewdata system to send a message to the IP who created it.

Teletext - Non-interactive information services which use broadcast signals to communicate information from a central computer to a user's terminal.

Telesoftware - A means of storing and distributing computer programs through a viewdata or teletext system.

Videotex - Generic term to cover both teletext and viewdata.

Viewdata - An interactive page-orientated computer information storage and retrieval system.

4-TEL - Channel 4's teletext service.

Reading list

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Burton J and Taylor J, Educational viewdata start-up & user guides, 2 vols & disc, CET, 1985. User guide ISBN 0 86184-140-9, start-up guide ISBN 0 86184-139-5, £35.00 (free to subscribers to Prestel Education Service).

Journals

Acorn User, monthly from newsagents or from Redwood Publishing, 68 Long Acre, London WC2E 9JH.

Educational Computing, monthly from newsagents £1.00 or £11.00 pa from EMAP Business and Computer Publications, Durant House, 8 Herbal Hill, London EC1R 5JB.

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